Development of a novel stomatal opening inhibitor and its mechanistic study

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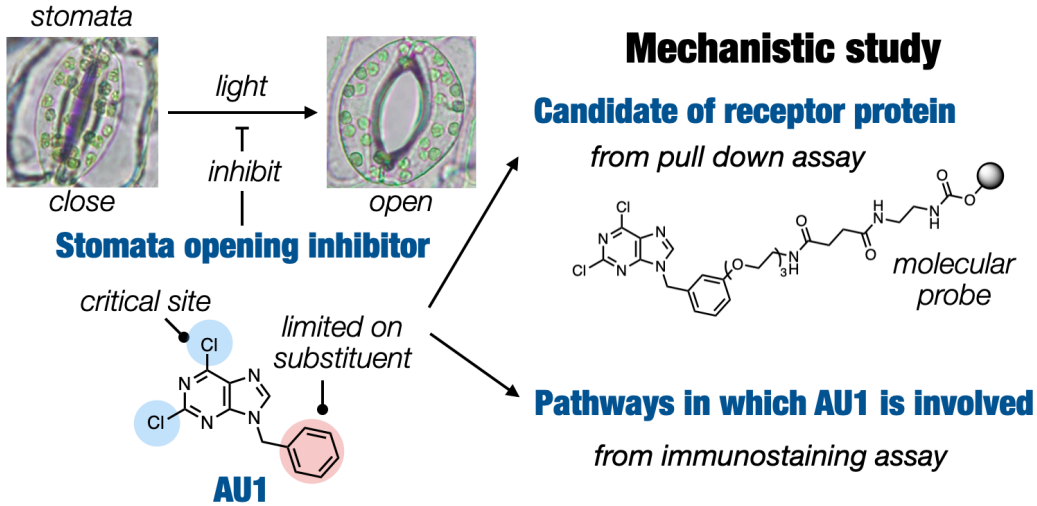
Stomata are pores in the epidermis of plants which open under light and close in dark or under dry condition. These stomatal movements relate to exchange of water and gas for respiration, photosynthesis, and stress tolerance. In the mechanism of these movements, a plasma membrane proton pump (H^+-ATPase) acts as an engine, but its detail molecular mechanism has been unclear yet. To understand the mechanism, a method controlling these movements at will have attracted much attention. In recent years, molecules that can control the stomatal movement, especially stomatal opening inhibitors, have been developed.[1] However, their receptors have been not identified due to a lack of enough investigation.

In this study, we newly discovered a synthetic small molecule AU1 that inhibit stomatal opening. The structure-activity relationship studies of AU1 were conducted to reveal that two chloride atoms on the purine structure were essential and to find the derivatization position causing low effect for the bioactivity. Based on this result, we synthesized a molecular probe for the pull-down assay, obtaining several candidates of target protein. In addition, the immunostaining assay revealed the pathways involved in the AU1.



1) Toh, T.; Inoue, S.; Toda, Y.; Yuki, T.; Suzuki, K.; Hamamoto, S.; Fukatsu, K.; Aoki, S.; Uchida, M.; Asai, E.; Uozumi, N.; Sato, A.; Kinoshita, T. *Plant Cell Physiol.* **2018**, *59*, 1568.